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Abstract

HEALTH AND SAFETY PRACTICE AND MANAGEMENT IN ATOMIC ENERGY OPERATIONS IN INDIA

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Nearly a decade's experience in the control and management of radiation protection with research reactors has gone into the building up of the health and safety organization in India to meet the demands of a very comprehensive programme of large scale application of atomic energy for peaceful purposes. India has three research reactors, a fuel reprocessing plant, isotope laboratories, processing and manufacturing units for basic reactor fuels production in different parts of the country. Two high power reactors with international collaboration are to start construction soon and more are in planning. Isotopes are used on an expanding scale in the country in diverse fields.

The radiation safety and control programme in the country is based on the recommendations of the ICRP. The adoption of ICRP recommendations to national conditions involves certain difficulties of interpretation when environmental population consist of persons with diverse habits and of characteristics very different from the ICRP Standard Man. The environmental restrictions necessary to comply with ICRP recommendations for exposure of general population will have to be interpreted in the light of critical food and critical nuclides and habits of the local population. The paper presents data collected for evolving an Indian Standard Man and development of safety standards for general population as well as occupational personnel.

Selection of sites for power reactors in India take due

considerations of fission product releases from different types of reactors on site, the environmental population and utilisation of the environment in the region of 1-30 miles from site, and the acceptable site radiological burden. The paper describes national practices for siting of power reactors, planning of preoperational surveys and management of environmental problems arising out of credible accidents. The paper gives experiences of radiation exposure and control in uranium mines and thorium processing plants.

Safety management of Trombay operations are given in some detail. Hazard evaluation of reactors and processing plants are carried out and measures recommended to improve safety of operations. The paper presents experiences of normal operations as well as some unusual incidents in reactors and outlines training and emergency programmes.

Environmental monitoring surveys are carried out as a routine for presence of natural, induced or fission product radioactivity and build up of radioactivity through operational release. Environmental monitoring techniques and data as well as tracer trials carried out for study of movement of discharged effluent activity are given in the paper.

Health Physics Organisation carries out internal contamination studies of persons exposed to radiation. Whole body measurement techniques are developed for specific as well as total internal contamination. Radiochemical examination of urine is made as a routine and recommendations made to avoid over exposure of personnel. The paper presents data of human exposure for different radionuclides over years and outlines recent radiochemical methods developed for the estimation of Ra^{228}, Ra^{224}, Th^{232}, Co^{60}, I^{131}, P^{32} and other nuclides in bioassay and environmental samples.